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Appl. No. 10/055,499
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Reply to Office action of November 30, 2007

AMENDMENTS

IN THE CLAIMS

5 Claims 1-280 (canceled)

281. (currently amended) A method for fabricating a chip package, comprising:

joining a first side of a die and a substrate using an adhesive material;

10 after said joining said first side of said die and said substrate, forming a first polymer layer over a second side of said die, over said substrate and across an edge of said die,
wherein said first and second sides are opposite to each other;

after said forming said first polymer layer, joining said die and said substrate,
forming a circuit layer on said first polymer layer, over said second side of said die, over
said substrate and across an said edge of said die, wherein said forming said circuit layer
15 comprises a copper electroplating process;

after said forming said circuit layer, forming an insulating layer on said circuit layer,
on said first polymer layer, over said second side of said die, over said substrate and
across said edge of said die;

20 after said forming said circuit layer, forming a gold bump over said circuit layer; and
after said forming said gold bump over said circuit layer, cutting said substrate.

282. (currently amended) A method for fabricating a chip package, comprising:

joining a first side of a die and a substrate using an adhesive material;

25 after said joining said first side of said die and said substrate, forming an insulating a first polymer layer over a second side of said die, over said substrate and across an edge
of said die, wherein said first and second sides are opposite to each other; comprising a
first portion over said die and a second portion over said substrate but not over said die,
wherein said insulating layer comprises a porous structure; and

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- after said forming said first polymer layer, forming a circuit layer on said first polymer layer, over said second side of said die, over said substrate and across said edge of said die, wherein said forming said circuit layer comprises a copper electroplating process, and wherein said circuit layer comprises a portion acting as a part of an inductor;
- 5 after said forming said circuit layer, forming a second polymer layer on said circuit layer, on said first polymer layer, over said second side of said die, over said substrate and across said edge of said die;
- after said forming said second polymer layer, forming a metal bump over said substrate, wherein said metal bump is connected to said die through said circuit layer; and
- 10 after said forming said metal bump, insulating layer, cutting said substrate.
283. (currently amended) A method for fabricating a chip package, comprising:
- joining a first side of a die and a substrate using an adhesive material;
- after said joining said first side of said die and said substrate, forming a first polymer
- 15 layer over a second side of said die, over said substrate and across an edge of said die, wherein said first and second sides are opposite to each other;
- after said forming said first polymer layer, joining said die and said substrate,
forming a circuit layer on said first polymer layer, over said second side of said die, over
said substrate and across said an edge of said die, wherein said forming said circuit layer
- 20 comprises a copper electroplating process, and wherein said circuit layer comprises a
portion acting as at least a part of a resistor, passive device, and
- after said forming said circuit layer, forming a second polymer layer on said circuit
layer, on said first polymer layer, over said second side of said die, over said substrate and
across said edge of said die;
- 25 after said forming said second polymer layer, forming a metal bump over said
substrate, wherein said metal bump is connected to said die through said circuit layer; and
after said forming said metal bump, circuit layer, cutting said substrate.

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284. (currently amended) A method for fabricating a chip package, comprising:

joining a first side of a die and a substrate using an adhesive material, wherein said die has a top surface at a horizontal level;

5 after said joining said first side of said die and said substrate, forming a first polymer layer over a second side of said die, over said substrate and across an edge of said die, wherein said first and second sides are opposite to each other;

10 after said forming said first polymer layer, forming a circuit layer on said first polymer layer, over said second side of said die, over said substrate and across said edge of said die, wherein said forming said circuit layer comprises a copper electroplating process, and wherein said circuit layer comprises a portion acting as a part of a waveguide;

after said forming said circuit layer, forming a second polymer layer on said circuit layer, on said first polymer layer, over said second side of said die, over said substrate and across said edge of said die;

15 after said forming said second polymer layer, forming a metal bump over said substrate, wherein said metal bump is connected to said die through said circuit layer; and

after said joining said die and said substrate, forming a waveguide over said horizontal level; and

20 after said forming said metal bump, waveguide, cutting said substrate.

285. (currently amended) A method for fabricating a chip package, comprising:

joining a first side of a die and a substrate using an adhesive material, wherein said die has a top surface at a horizontal level;

25 after said joining said first side of said die and said substrate, forming a first polymer layer over a second side of said die, over said substrate and across an edge of said die, wherein said first and second sides are opposite to each other;

after said forming said first polymer layer, forming a circuit layer on said first polymer layer, over said second side of said die, over said substrate and across said edge

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- of said die, wherein said forming said circuit layer comprises a copper electroplating process, and wherein said circuit layer comprises a portion acting as a part of a capacitor;
after said forming said circuit layer, forming a second polymer layer on said circuit layer, on said first polymer layer, over said second side of said die, over said substrate and
5 across said edge of said die;
after said forming said second polymer layer, forming a metal bump over said substrate, wherein said metal bump is connected to said die through said circuit layer; and
after said joining said die and said substrate, forming a micro-electronic-mechanical-element over said horizontal level; and
10 after said forming said metal bump, micro-electronic-mechanical element, cutting said substrate.

286. (currently amended) A method for fabricating a chip package, comprising:
joining a first side of a die and a substrate using an adhesive material, wherein said
15 die has a top surface at a horizontal level;
after said joining said first side of said die and said substrate, forming a first polymer layer over a second side of said die, over said substrate and across an edge of said die, wherein said first and second sides are opposite to each other;
after said forming said first polymer layer, forming a circuit layer on said first
20 polymer layer, over said second side of said die, over said substrate and across said edge of said die, wherein said forming said circuit layer comprises a copper electroplating process, and wherein said circuit layer comprises a portion acting as a part of a filter;
after said forming said circuit layer, forming a second polymer layer on said circuit layer, on said first polymer layer, over said second side of said die, over said substrate and
25 across said edge of said die;
after said forming said second polymer layer, forming a metal bump over said substrate, wherein said metal bump is connected to said die through said circuit layer; and
after said joining said die and said substrate, forming a filter over said horizontal-

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level; and

after said forming said metal bump, ~~filter-cutting~~ said substrate.

287. (currently amended) The method of Claim 281, wherein said forming said insulating
5 layer is followed by said forming said gold bump, further comprising forming a polymer
layer comprising a first portion over said die and a second portion over said substrate but
not over said die, followed by said forming said circuit layer over said polymer layer.

288. (currently amended) The method of Claim 281, 287, wherein said forming said first
10 polymer layer comprises a curing process.

289. (currently amended) The method of Claim 281, 287, wherein said forming said first
polymer layer comprises a grinding process.

15 290. (currently amended) The method of Claim 281, 287, wherein said forming said first
polymer layer comprises an etching process.

291. (currently amended) The method of Claim 281, wherein said first polymer layer
comprises polyimide, further comprising forming a polymer layer over said circuit layer,
20 followed by said forming said gold bump.

292. (currently amended) The method of Claim 281, wherein said first polymer layer
comprises benzocyclobutene (BCB), forming said circuit layer comprises electroplating,

25 293. (currently amended) The method of Claim 281, wherein said substrate comprises a
polymer, forming said circuit layer comprises electroless plating,

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294. (currently amended) The method of Claim 281, wherein said substrate comprises an inide resin, ~~forming said circuit layer comprises sputtering.~~

295. (currently amended) The method of Claim 281, after said joining said first side of said die and said substrate, further comprising forming a second polymer layer over said substrate and surrounding said die, followed by said forming said ~~circuit-first polymer~~ layer further on over said die and over said second polymer layer.

296. (currently amended) The method of Claim 295, wherein said forming said second polymer layer comprises a curing process.

297. (currently amended) The method of Claim 295, wherein said forming said second polymer layer comprises a grinding process.

298. (currently amended) The method of Claim 295, wherein said forming said second polymer layer comprises an etching process.

299. (currently amended) The method of Claim ~~295, 281~~, wherein said second polymer layer comprises epoxy, ~~cutting said substrate comprises a laser cutting process.~~

300. (previously presented) The method of Claim 281, wherein said cutting said substrate comprises a mechanical cutting process.

301. (currently amended) The method of Claim 282, wherein said second polymer layer comprises polyimide, ~~after said forming said insulating layer, further comprising forming a circuit layer over said insulating layer, followed by said cutting said substrate.~~

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302. (currently amended) The method of Claim 282, 301, wherein said second polymer layer comprises benzocyclobutene (BCB), ~~forming said circuit layer comprises electroplating.~~

5 303. (currently amended) The method of Claim 282, 301, wherein said substrate comprises a polymer, ~~forming said circuit layer comprises electroless plating.~~

304. (currently amended) The method of Claim 282, 301, wherein said first polymer layer comprises polyimide, ~~forming said circuit layer comprises sputtering.~~

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305. (currently amended) The method of Claim 282, wherein said first polymer layer comprises benzocyclobutene (BCB), ~~after said joining said die and said substrate, further comprising forming a circuit layer over said die and across an edge of said die, followed by said forming said insulating layer over said circuit layer.~~

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306. (currently amended) The method of Claim 282, 305, wherein said forming said first polymer circuit layer comprises a curing process, ~~electroplating.~~

20 307. (currently amended) The method of Claim 282, 305, wherein said forming said first polymer circuit layer comprises a grinding process, ~~electroless plating.~~

308. (currently amended) The method of Claim 282, 305, wherein said forming said first polymer circuit layer comprises an etching process, ~~sputtering.~~

25 309. (currently amended) The method of Claim 282, after said joining said first side of said die and said substrate, further comprising forming a third polymer layer over said substrate and surrounding said die, followed by said forming said first polymer insulating.

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layer ~~further on comprising said first portion over said die and said second portion over~~
said third polymer layer.

310. (currently amended) The method of Claim 309, wherein said forming said third
5 polymer layer comprises a curing process.

311. (currently amended) The method of Claim 309, wherein said forming said third
polymer layer comprises a grinding process.

10 312. (currently amended) The method of Claim 309, wherein said forming said third
polymer layer comprises an etching process.

313. (previously presented) The method of Claim 282, wherein said cutting said substrate
comprises a mechanical cutting process.

15 314. (currently amended) The method of Claim 282, wherein said forming said second
polymer insulating layer comprises a curing process.

315. (currently amended) The method of Claim 282, wherein said forming said second
20 polymer insulating layer comprises a grinding process.

316. (currently amended) The method of Claim 282, wherein said forming said second
polymer insulating layer comprises an etching process.

25 317. (currently amended) The method of Claim 309, 282, wherein said third polymer
layer comprises epoxy, after said forming said insulating layer, further comprising
forming a passive device over said insulating layer.

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318. (currently amended) The method of Claim 282, wherein said forming said metal bump comprises forming a solder bump over said substrate, after said forming said insulating layer, further comprising forming a solder bump over said insulating layer.
- 5 319. (currently amended) The method of Claim 282, wherein said forming said metal bump comprises forming a gold bump over said substrate, after said forming said insulating layer, further comprising forming a gold bump over said insulating layer.
- 10 320. (currently amended) The method of Claim 283, wherein said first polymer layer comprises polyimide, further comprising forming a polymer layer comprising a first portion over said die and a second portion over said substrate but not over said die, followed by said forming said circuit layer over said polymer layer.
- 15 321. (currently amended) The method of Claim 283, 320, wherein said forming said first polymer layer comprises a curing process.
322. (currently amended) The method of Claim 283, 320, wherein said forming said first polymer layer comprises a grinding process.
- 20 323. (currently amended) The method of Claim 283, 320, wherein said forming said first polymer layer comprises an etching process.
324. (currently amended) The method of Claim 283, wherein said second polymer layer comprises polyimide, further comprising forming a polymer layer over said circuit layer,
25 followed by said cutting said substrate.
325. (currently amended) The method of Claim 283, after said joining said first side of said die and said substrate, further comprising forming a third polymer layer over said

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substrate and surrounding said die, followed by said forming said first polymer circuit-
layer further on over said die and over said third polymer layer.

326. (currently amended) The method of Claim 325, wherein said forming said third
5 polymer layer comprises a curing process.

327. (currently amended) The method of Claim 325, wherein said forming said third
polymer layer comprises a grinding process.

10 328. (currently amended) The method of Claim 325, wherein said forming said third
polymer layer comprises an etching process.

329. (previously presented) The method of Claim 283, wherein said cutting said substrate
comprises a mechanical cutting process.

15 330. (currently amended) The method of Claim 283, wherein said forming said metal
bump comprises forming a solder bump over said substrate. after said forming said circuit
layer, further comprising forming a solder bump over said substrate but not over said die,
followed by said cutting said substrate.

20 331. (currently amended) The method of Claim 283, wherein said forming said metal
bump comprises forming a gold bump over said substrate. after said forming said circuit
layer, further comprising forming a gold bump over said substrate but not over said die,
followed by said cutting said substrate.

25 332. (currently amended) The method of Claim 283, wherein said first polymer layer
comprises benzocyclobutene (BCB). passive device comprises a resistor.

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333. (currently amended) The method of Claim 325, 283, wherein said third polymer layer passive device comprises epoxy, a capacitor.

5 334. (currently amended) The method of Claim 283, wherein said substrate comprises a polymer, passive device comprises an inductor.

335. (currently amended) The method of Claim 284, wherein said first polymer layer comprises polyimide, further comprising forming a polymer layer comprising a first portion over said die and a second portion over said substrate but not over said die,
10 followed by said forming said waveguide over said polymer layer.

336. (currently amended) The method of Claim 284, 335, wherein said forming said first polymer layer comprises a curing process.

15 337. (currently amended) The method of Claim 284, 335, wherein said forming said first polymer layer comprises a grinding process.

338. (currently amended) The method of Claim 284, 335, wherein said forming said first polymer layer comprises an etching process.

20 339. (currently amended) The method of Claim 284, wherein said second polymer layer comprises polyimide, further comprising forming a polymer layer over said waveguide, followed by said cutting said substrate.

25 340. (currently amended) The method of Claim 284, after said joining said first side of said die and said substrate, further comprising forming a third polymer layer over said substrate and surrounding said die, followed by said forming said first polymer layer further on waveguide over said third polymer layer.

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341. (currently amended) The method of Claim 340, wherein said forming said third polymer layer comprises a curing process.

5 342. (currently amended) The method of Claim 340, wherein said forming said third polymer layer comprises a grinding process.

343. (currently amended) The method of Claim 340, wherein said forming said third polymer layer comprises an etching process.

10

344. (previously presented) The method of Claim 284, wherein said cutting said substrate comprises a mechanical cutting process.

15 345. (currently amended) The method of Claim 284, wherein said forming said metal bump comprises forming a solder bump over said substrate, after said forming said waveguide, further comprising forming a solder bump over said substrate but not over said die, followed by said cutting said substrate.

20 346. (currently amended) The method of Claim 284, wherein said forming said metal bump comprises forming a gold bump over said substrate, after said forming said waveguide, further comprising forming a gold bump over said substrate but not over said die, followed by said cutting said substrate.

25 347. (currently amended) The method of Claim 285, wherein said first polymer layer comprises polyimide, further comprising forming a polymer layer comprising a first portion over said die and a second portion over said substrate but not over said die, followed by said forming said micro-electronic-mechanical element over said polymer layer.

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348. (currently amended) The method of Claim ~~285, 347~~, wherein said forming said first polymer layer comprises a curing process.

5 349. (currently amended) The method of Claim ~~285, 347~~, wherein said forming said first polymer layer comprises a grinding process.

350. (currently amended) The method of Claim ~~285, 347~~, wherein said forming said first polymer layer comprises an etching process.

10

351. (currently amended) The method of Claim 285, ~~wherein said second polymer layer comprises polyimide, further comprising forming a polymer layer over said micro-electronic-mechanical element, followed by said cutting said substrate.~~

15 352. (currently amended) The method of Claim 285, after said joining said first side of said die and said substrate, further comprising forming a third polymer layer over said substrate and surrounding said die, followed by said forming said first polymer layer further on micro-electronic-mechanical element over said third polymer layer.

20 353. (currently amended) The method of Claim 352, wherein said forming said third polymer layer comprises a curing process.

354. (currently amended) The method of Claim 352, wherein said forming said third polymer layer comprises a grinding process.

25

355. (currently amended) The method of Claim 352, wherein said forming said third polymer layer comprises an etching process.

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356. (previously presented) The method of Claim 285, wherein said cutting said substrate comprises a mechanical cutting process.

357. (currently amended) The method of Claim 285, wherein said forming said metal
5 bump comprises forming a solder bump over said substrate, after said forming said micro-
electronic mechanical element, further comprising forming a solder bump over said
substrate but not over said die, followed by said cutting said substrate.

358. (currently amended) The method of Claim 285, wherein said forming said metal
10 bump comprises forming a gold bump over said substrate, after said forming said micro-
electronic mechanical element, further comprising forming a gold bump over said
substrate but not over said die, followed by said cutting said substrate.

359. (currently amended) The method of Claim 286, wherein said first polymer layer
15 comprises polyimide, further comprising forming a polymer layer comprising a first
portion over said die and a second portion over said substrate but not over said die,
followed by said forming said filter over said polymer layer.

360. (currently amended) The method of Claim 286, 359, wherein said forming said first
20 polymer layer comprises a curing process.

361. (currently amended) The method of Claim 286, 359, wherein said forming said first
polymer layer comprises a grinding process.

25 362. (currently amended) The method of Claim 286, 359, wherein said forming said first
polymer layer comprises an etching process.

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363. (currently amended) The method of Claim 286, wherein said second polymer layer comprises polyimide, further comprising forming a polymer layer over said filter, followed by said cutting said substrate.

5 364. (currently amended) The method of Claim 286, after said joining said first side of said die and said substrate, further comprising forming a third polymer layer over said substrate and surrounding said die, followed by said forming said first polymer layer further on filter over said third polymer layer.

10 365. (currently amended) The method of Claim 364, wherein said forming said third polymer layer comprises a curing process.

366. (currently amended) The method of Claim 364, wherein said forming said third polymer layer comprises a grinding process.

15 367. (currently amended) The method of Claim 364, wherein said forming said third polymer layer comprises an etching process.

20 368. (previously presented) The method of Claim 286, wherein said cutting said substrate comprises a mechanical cutting process.

25 369. (currently amended) The method of Claim 286, wherein said forming said metal bump comprises forming a solder bump over said substrate, after said forming said filter, further comprising forming a solder bump over said substrate but not over said die, followed by said cutting said substrate.

370. (currently amended) The method of Claim 286, wherein said forming said metal bump comprises forming a gold bump over said substrate, after said forming said filter,

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~~further comprising forming a gold bump over said substrate but not over said die,
followed by said cutting said substrate.~~